

LISTING OF THE CLAIMS:

Claims 1-9 (Canceled).

Claim 10 (Currently amended) A method of ~~selectively removing a damaged portion of a ferroelectric layer with a cleaning solution~~ cleaning an integrated circuit having a ferroelectric layer, the method comprising:

providing an integrated circuit substrate having an exposed ferroelectric layer with ~~the a~~ damage portion; and

selectively removing a damaged portion of the exposed ferroelectric layer with a cleaning solution by contacting the exposed ferroelectric layer with ~~the~~ said cleaning solution, wherein said cleaning solution including comprises a fluoride, an organic acid having a carboxyl group, an alkaline pH adjusting agent, and water.

Claim 11 (Currently amended) The method of claim 10, wherein the exposed ferroelectric layer includes ~~the a~~ surface of the ferroelectric layer passed through annealing after deposition on the integrated circuit substrate, and the step of making contacting the exposed ferroelectric layer contact the with said cleaning solution includes etching back the ferroelectric layer by about 100 Å to about 500 Å from the a top portion of the ferroelectric layer.

Claim 12 (Currently amended) The method of claim 10, wherein the exposed ferroelectric layer is interposed between upper and lower electrode layers, and the method further comprises forming a capacitor by patterning the upper electrode layer, the ferroelectric layer and the lower electrode layer, before contacting the exposed ferroelectric layer with ~~the~~ said cleaning solution.

Claim 13 (Currently amended) The method of claim 10, wherein the pH of the cleaning solution is ~~about 4.5 greater than 5~~ to about 6.0.

Claim 14 (Original) The method of claim 10, wherein the fluoride is hydrogen fluoride, hydroboron tetrafluoride or ammonium fluoride.

Claim 15 (Original) The method of claim 10, wherein the organic acid is formic acid, acetic acid or citric acid.

Claim 16 (Original) The method of claim 10, wherein the alkaline pH adjusting agent is ammonium hydroxide, potassium hydroxide, tetramethylammonium hydroxide or tetraethylammonium hydroxide.

Claim 17 (Currently amended) The method of claim 10, wherein the content of the fluoride is about 0.01% to about 1% by weight based on the total weight of the said cleaning solution.

Claim 18 (Currently amended) The method of claim 10 wherein the content of the organic acid with carboxyl group is about 1% to about 50% by weight based on the total weight of the said cleaning solution.

Claim 19 (Currently amended) The method of claim 10, wherein the content of the alkali pH adjusting agent is about 0.25% to about 15% by weight based on the total weight of the said cleaning solution.

Claim 20 (New) A method of cleaning an integrated circuit, the method comprising:
providing an integrated circuit having an exposed ferroelectric layer; and
selectively removing a damaged portion of the exposed ferroelectric layer with a cleaning solution by contacting the exposed ferroelectric layer with said cleaning solution, wherein said cleaning solution comprises a fluoride, an organic acid having a carboxyl group, an alkaline pH adjusting agent, and water, and wherein the organic acid dissolves a reduced metallic component of the ferroelectric layer.

Claim 21 (New) The method of claim 20, further comprises the step of:
depositing and annealing the ferroelectric layer prior to selectively removing the damage portion of the ferroelectric layer.

Claim 22 (New) The method of claim 20, wherein the step of selectively removing the damage portion of the ferroelectric layer includes removing a semi-stable pyrochlore structure that appears from a top portion of the ferroelectric layer to a predetermined depth.

Claim 23 (New) The method of claim 20, wherein the pH of the cleaning solution is greater than 5 to about 6.0.

Claim 24 (New) The method of claim 20, wherein contacting the exposed ferroelectric layer with said cleaning solution includes the exposed ferroelectric layer in contact with said cleaning solution for about 30 to about 600 seconds such that the damaged portion of the ferroelectric layer is completely removed.

Claim 25 (New) The method of claim 20, wherein the exposed ferroelectric layer includes a surface of the ferroelectric layer passed through annealing after deposition on the integrated circuit substrate, and the step of contacting the exposed ferroelectric layer with said cleaning solution includes etching back the ferroelectric layer by about 100 Å to about 500 Å from a top portion of the ferroelectric layer.

Claim 26 (New) The method of claim 20, wherein the exposed ferroelectric layer is interposed between upper and lower electrode layers, and the method further comprises forming a capacitor by patterning the upper electrode layer, the ferroelectric layer and the lower electrode layer, before contacting the exposed ferroelectric layer with said cleaning solution.

Claim 27 (New) The method of claim 20, wherein the fluoride is hydrogen fluoride, hydroboron tetrafluoride, or ammonium fluoride.

Claim 28 (New) The method of claim 20, wherein the organic acid is formic acid, acetic acid, or citric acid.

Claim 29 (New) The method of claim 20, wherein the alkaline pH adjusting agent is ammonium hydroxide, potassium hydroxide, tetramethylammonium hydroxide, or tetraethylammonium hydroxide.

Claim 30 (New) The method of claim 20, wherein the content of the fluoride is about 0.01% to about 1% by weight based on the total weight of said cleaning solution.

Claim 31 (New) The method of claim 20, wherein the content of the organic acid with carboxyl group is about 1% to about 50% by weight based on the total weight of said cleaning solution.

Claim 32 (New) The method of claim 20, wherein the content of the alkali pH adjusting agent is about 0.25% to about 15% by weight based on the total weight of said cleaning solution.

Claim 33 (New) The method of claim 20, wherein the ferroelectric layer is formed of a STO, a BST, a PZT, or a PLZT layer.